

REMARKS

In light of the age of this application, Applicants respectfully request that this amendment be entered and considered by the Examiner at the Examiner's earliest possible convenience.

Applicants have the following comments in support of this amendment and in response to the Office Action.

Claim Amendments – Reference to Disclosure

The amended claims of the present application are directed to certain novel apparatus adapted for imaging tissue. Specific amendments to the independent claims¹ are as follows:

Independent Claim 26 has been amended to incorporate the subject matter of original dependent Claims 31 and 32 (now canceled).

Independent Claim 33 has similarly been amended to incorporate a portion of the subject matter of original dependent Claim 37 (now canceled).

Independent Claim 38 has been amended to incorporate the subject matter of original dependent Claim 39 (now canceled).

Independent Claim 41 has been amended to clarify that the claimed apparatus is adapted to in vivo medical diagnostic imaging (Claims 26, 33 and 38 have also been amended to recite that the apparatus is adapted for in vivo imaging). This amendment includes incorporation of the subject matter of original dependent Claim 50 (now canceled). Such apparatus is clearly described at multiple locations throughout the specification of the present application, including at, for example, p. 14, lines 15-16. Hence, no new matter is being added.

¹Applicants are also amending some of the dependent claims to correct informalities therein.

Accordingly, Applicants respectfully submit that the amendments to independent Claims 26, 33, 38 and 41 (and the dependent claims) are not adding any new matter and are clearly supported by the application as filed. Therefore, it is requested that these amendments be entered and considered at this time.

Claim Rejections – 35 USC §102

In the Office Action, the Examiner rejects Claims 26-30, 33-36, 38, 41-43 and 47-51 under 35 U.S.C. §102(b) as being anticipated by Denk et al. (US 5,034,613). This rejection is respectfully traversed for at least the following reasons.

In particular, independent Claims 26, 33 and 41 of the present application are directed to an apparatus for imaging living tissue in vivo. Such imaging requires use of light beams adapted for delivery into specimens of substantial depth.

There is no disclosure or suggestion in Denk regarding such imaging or apparatus for such imaging in vivo. In fact, the microscope apparatus in Denk is not and cannot be adapted to such imaging as the tightly focused light produced by the microscope objectives in Denk (see, for example, col. 2, lines 38-41) is not suitable for imaging in vivo tissue due to the extremely short focal length characteristic of such objectives. For example, Denk states in the Description of Preferred Embodiment that “the intensity of the long wavelength incident light becomes high enough to excite [TPE] only in the region of the focal point 26 of the microscope optics” (Col. 6, lines 13-16). As would be clear to one of ordinary skill in the art, such optics typically have focal lengths on the order of several mm or less, which would be too short to achieve in vivo imaging, such as in the claimed invention.

In contrast, the present application claims and teaches an effective means for overcoming

these shortcomings in Denk. One way that the present invention overcomes these shortcomings is based on apparatus for substantial pre-expansion of the activating light beam (to produce a collimated beam) prior to focusing into tissue of interest (p. 27, lines 4-22). As illustrated in Figs. 9 and 10, Applicants' innovative light conditioning for producing a collimated beam allows spatially confined photo-activation of molecular agents within tissue. Such photo-activation is not possible with the apparatus of Denk nor does Denk disclose or suggest means for producing such a collimated beam.

Furthermore, the apparatus of independent Claims 26, 33 and 38 of the present application includes apparatus to produce a demodulated energy signal which is characteristic of the particular photo-activated molecular agent to substantially enhance the quality of the images obtained therewith. There is no disclosure or suggestion in Denk regarding such demodulation or apparatus therefor.

Accordingly, for at least the above-stated reasons, independent Claims 26, 33, 38 and 41 are not disclosed or suggested by Denk and are patentable thereover. Therefore, it is respectfully requested that this rejection be withdrawn.

Claim Rejections – 35 USC §103

The Examiner also rejects Claims 31-32, 37, 39-40 and 44-46 under 35 U.S.C. §103(a) as being unpatentable over Denk. This rejection is also respectfully traversed for at least the following reasons.

As explained above, Claims 31-32, 37, and 39-40 have been canceled, and their subject matter incorporated into their respective base claims (i.e., independent Claims 26, 33 and 38). These independent claims are directed to an apparatus for in vivo imaging of tissue, as described *supra* with

regard to the Examiner's section 102 rejections. As noted *supra* with regard to these rejections, Denk fails to describe or suggest the presently claimed apparatus.

Furthermore, Denk fails to describe or suggest the demodulation and apparatus therefor of amended independent Claims 26, 33 and 38. This failure is particularly striking given that Denk utilizes an inherently modulated light source (see col. 2, lines 42-47). The fact that demodulation techniques were known at the time of Denk, yet Denk fails to consider their use, demonstrates that Applicants' demodulation techniques and apparatus incorporated in the claimed imaging apparatus is non-obvious, even to one such as Denk who is clearly of more than ordinary skill in the art.

Furthermore, Claims 44-46 of the present application are dependent claims whose base claim is directed to apparatus adapted for in vivo imaging of living tissue. Such imaging requires use of special light beams adapted for delivery into specimens of substantial depth, a subject on which, as discussed *supra* with regard to the Examiner's section 102 rejections, Denk is silent. Furthermore, as described *supra* with regard to Claims 31-32, 37, Denk fails to consider the demodulation of Claims 44-46, thereby demonstrating that Applicants' demodulation apparatus in the claimed invention is novel and non-obvious.

Accordingly, for at least the above-stated reasons, the presently claimed invention is patentable over Denk, and it is respectfully requested that this rejection be withdrawn.

Conclusion


For at least the above-stated reasons, it is respectfully submitted that the claims of the present application are in an allowable condition and are patentable over the cited references. Accordingly, it is requested that the application now be allowed.

If any further fee should be due for this amendment, please charge our deposit account
50/1039.

Favorable reconsideration is earnestly solicited.

Respectfully submitted,

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